Name: _____ Context:_____ Date:_____

Standards of Mathematical Practices Rubric

SMP	Needs Improvement	Emerging	Proficient	Exemplary
MP.1 Make Sense of Problems and Persevere in Solving Them	Does not work independently or collaboratively; requires continual assistance from teacher or other students.	Works independently and collaboratively with some reliance on the teacher or other students.	Works independently and collaboratively with little reliance on the teacher.	Works independently and leads group in collaboration.
	Gives up easily; rarely takes initiative to find new information or methodologies to solve a problem.	Gives up occasionally; persists only when comfortable; occasionally takes initiative to find some new information or one methodology to solve a problem.	Generally shows some persistence; may give up when extremely challenged; comfortable seeking new information or exploring one or two methodologies to solve a problem.	Continues working when challenged, regularly taking initiative to find new information; fluid in using multiple methodologies and approaches to solve a problem.
	Does not know how to get started on a problem.	Finds an entry point to problem.	Finds one or two entry points to problem.	Discovers multiple entry points to problems.
	Focuses on answers and procedures instead of problem; does not understand the question of interest being asked; does not analyze varying aspects of the problem.	Tries to make sense of the problem but may need prompting by classmates or teacher. Tries something even if not correct; analyzes some of the aspects of the problem.	Makes sense of the problem; breaks down problems into simpler pieces; articulates the problem into their own words; analyzes information, makes conjectures and plans a solution pathway.	Makes sense and breaks down problems, synthesizing the results when presenting solutions; connects known mathematical ideas and procedures to real-world situations; makes conjectures and plans a solution pathway based on analysis.
	Does not monitor or evaluate progress; does not check their work or evaluate his or her answer to see if it makes sense.	Occasionally monitors and evaluates the progress; may check and revise work by plugging numbers in; may not check for reasonableness.	Regularly monitors and evaluates the progress; checks work and determines reasonableness of solution within context and makes necessary modifications.	Monitors and evaluates the progress, changing course as necessary; checks reasonableness; defends and justifies solution by comparing multiple solution paths.
	Does not answer the question of interest.	Partially answers the question of interest.	Thoroughly answers the question of interest.	Thoroughly answers the question and poses new question(s); generalizes.

SMP	Needs Improvement	Emerging	Proficient	Exemplary
MP.2 Reason Abstractly and Quantitatively.	Does not understand that quantities have meaning.	Understands that quantities having meaning, but not able to see all the relationships between quantities.	Attends to the meaning of quantities and the relationships between quantities, rather than simply computing them.	Attends to the meaning of quantities and the relationships between quantities, rather than simply computing them; generalizes their relationships to new situations.
	Ignores units.	Considers the units involved but does not understand how they relate to the problem; may use units as labels.	Pays attention to units and uses them appropriately.	Analyzes the use of symbols, variables and units accurately, consistently and appropriately.
	Uses memorized procedures and algorithms incorrectly; cannot represent a situation symbolically.	Uses memorized procedures and algorithms but is not able to explain underlying concepts; can represent and manipulate simple situations symbolically.	Sees connections between procedures or algorithms and contextual meaning but has difficulty articulating them; can represent and manipulate routine situations symbolically.	Articulates connections between procedures or algorithms and contextual meaning; can take a situation and flexibly represent it symbolically and then manipulate the symbols (decontextualize).
	Does not see a connection between the symbolic representation and the context.	Sees a connection between the symbolic representation and the context but has difficulty articulating it.	Takes a symbolic situation and relates it to the context (contextualize).	Takes a symbolic situation and relates it to the context and other similar contexts.
	Does not use representations when approaching a problem.	Uses some representations to represent the problem.	Creates a coherent representation of the problem.	Creates, interprets, models, and connects multiple representations coherently.
	Does not finish calculations or interpret solutions.	Finishes calculations but does not interpret solutions.	Interprets solutions appropriately.	Looks beyond solutions to make predictions, generalizations, and decisions.

SMP	Needs Improvement	Emerging	Proficient	Exemplary
MP.3 Construct Viable Arguments and Critique the Reasoning of Others	Does not offer any explanation.	Explains reasoning, but does not use mathematical language; attempts to use an object, graph, chart, etc.	Explains and defends reasonings using mathematical language; explains each step and the reasoning behind it using objects, graphs, charts, etc.	Articulates and defends reasoning using concise mathematical language using objects, graphs, charts, etc.
	Does not look for errors; arguments are based on opinion.	Identifies some errors; uses some arguments and logic, but arguments may have holes.	Analyzes a problem for errors and misconceptions; uses logical mathematical arguments to support and justify solutions.	Analyzes a problem for misconceptions and errors in logic, computation, and methodologies; uses logical arguments and justifies conclusions; uses definitions and previously established results in constructing arguments.
	Does not defend or give rationale for the choices they made.	Defends their own choices, but concludes which plan is best without solid support, or concludes a single plan is best rather than looking at the conditions under which each plan is best.	Defends their own choices; concludes their choice is best by looking at the conditions of each plan.	Defends their own choices; concludes their choice is best by looking at the conditions of each plan and gives evidence to support their choices.
	Does not seek to understand classmates' solutions.	Asks for clarification of classmates' solutions.	Questions classmates' solutions and asks "Why?"	Asks classmates probing questions to clarify and improve their arguments.
	Does not list assumptions or logical conjectures.	Lists assumptions and logical conjectures but may not be able to clearly differentiate between them.	Differentiates between assumptions and logical conjectures.	Makes, recognizes and challenges assumptions and logical conjectures by providing evidence; evaluates peer arguments; able to compare the effectiveness of two plausible arguments.

Ohio | Department of Education

SMP	Needs Improvement	Emerging	Proficient	Exemplary
MP.4 Model with Mathematics.	Does not attempt to make a simpler problem	Attempts to make a simpler problem; does not identify assumptions.	Uses and identifies, assumptions and approximations to make a simpler problem.	Uses and identifies, assumptions and approximations to make a simpler problem; explains how assumptions and/or approximations affect their solution.
	Does not have a model or chooses an inappropriate model.	Uses a model to describe patterns or trends; it may be incomplete or partial model; explains the appropriateness of their model.	Identifies important quantities and maps their relationships using tools such as diagrams, two-way tables, graphs, flowcharts, and/or formulas, etc.; uses their model to describe patterns or trends; evaluates and explains appropriateness of their model.	Creates a model based upon important quantities; evaluates and explains the appropriateness of their model including variables and procedures; reflects on their model and makes any necessary revisions.
	Does not identify variables.	Can correctly identify some, but not all, of the variables.	Identifies and justifies choice of variables in the problem; identifies extraneous or missing information.	Identifies and justifies choice of all variables in the problem; identifies extraneous information; seeks out missing information.
	Does not compute results correctly; not able to interpret their results.	Computes results correctly, but interprets their results, incorrectly, or interprets their results but computes incorrectly.	Computes and interprets results correctly and reports findings using a mixture of representations.	Computes and interprets results and justifies the reasonableness of their results and procedures within the task's context.
	Does not check work.	Checks some calculations.	Checks calculations and checks to see if an answer makes sense within the context of a situation.	Checks to see if an answer makes sense within the context of a situation and changes a model when necessary.

Ohio | Department of Education

SMP	Needs Improvement	Emerging	Proficient	Exemplary
MP.5 Use appropriate tools strategically.	Needs teacher or classmate to instruct them on which tool to choose.	Selects an appropriate tool but is unsure how to use the tool to complete the task. Able to use the tool with some assistance.	Makes sound decisions about the use of specific tools; chooses and uses tools including technology independently to complete tasks.	Makes sound decisions about multiple tools including technology flexibly to complete tasks finding appropriate alternatives when typical tools are not available.
	Does not consider whether or tool is effective or has limitations.	Evaluates some of the effectiveness or limitations of a tool.	Thoroughly evaluates effectiveness or limitations of a tool.	Evaluates effectiveness or limitation or limitations of a tool and leverages that knowledge when analyzing a solution to a problem.
	Does not use tools including technology correctly or efficiently; does not use tools appropriately in exploration of concepts	Uses tools including technology correctly but inefficiently; uses tools appropriately to explore understanding of concepts but struggles to reach conclusions.	Uses tools including technology correctly, efficiently, and strategically; uses technological tools appropriately to explore understanding of concepts and is able to reach conclusions.	Uses tools including technology correctly, efficiently, and strategically; uses technological tools to deepen understanding of concepts, visualize the results of assumptions, explore consequences, and compare predictions with data.
	Does not consider when a solution provided by technology does not make sense.	Realizes when a solution provided by technology does not make sense.	Evaluates the results produced by technology to detect possibly errors by strategically using estimation and other mathematical knowledge.	Evaluates the results produced by technology to detect possibly errors, making adjustments to the tool and revises solutions or chooses other technological platforms.

Ohio | Department of Education

SMP	Needs Improvement	Emerging	Proficient	Exemplary
MP.6 Attend to Precision.	Does not address the question completely or directly; gives incomplete or wrong responses.	Makes an incomplete attempt to answer the question; does not formulate further responses when necessary.	Answers the question of interest thoroughly and precisely; provides carefully formulated explanations; revises responses when necessary.	Answers the question of interest thoroughly and precisely; provides carefully formulated explanations; identifies when others are not addressing the question completely.
	Fails to communicate; unable to decipher appropriate depth of communication needed, e.g., goes off on tangents or does not provide relevant information.	Communicates with vague or incorrect terminology.	Communicates clearly with a good grasp of the mathematical terminology. uses mathematical vocabulary carefully.	Communicates clearly and concisely examining claims and makes explicit use of mathematical definitions.
	Calculates inaccurately; forgets to specify the meaning of symbols and units and to provide labels.	Calculates accurately but not precisely, occasionally specifying the meaning of symbols and units and providing labels.	Calculates accurately and efficiently, expressing numerical answers with a degree of precision; states the meaning of symbols, specifying units of measure and providing accurate labels.	Calculates accurately and efficiently and uses proper precision in procedures; states the meaning of symbols, carefully specifying units of measure and providing accurate labels.
	Does not determine the necessary level of precision.	Determines a level of precision; may not be the best choice.	Determines the necessary level of precision; distinguishes between exact and approximate answers and determines which is more useful depending on the context.	Determine the necessary level of precision noting error or uncertainty; distinguishes between exact and approximate answers and determines which is more useful depending on the context.

SMP	Needs Improvement	Emerging	Proficient	Exemplary
MP.7 Look for and Make Use of Structure.	Applies an algorithm or method without evaluating their choice; does not use an efficient or appropriate approach.	Only uses one appropriate method or algorithm for a problem even though there may be more efficient approaches.	Analyzes a task and finds more than one method or algorithm to a problem; takes efficiency into consideration.	Uses the most efficient method, algorithm, or solution path for a task based on mathematical structure.
	Cannot articulate why they chose an algorithm or solution path.	Analyzes task before automatically applying an algorithm or solution path; explains why they choose an algorithm or solution path.	Analyzes task before automatically applying an algorithm or solution path; articulates and justifies their choice of algorithm or solution path.	Analyzes task before automatically applying an algorithm or solution path; articulates and justifies choice of algorithm or solution path, defends their choice and questions others' choices.
	Does not recognize that quantities can be represented in different ways.	Looks for patterns or structures, recognizing that quantities can be represented in different ways; recognizes equivalent forms, but may not be able to choose the best form to use.	Recognizes the significance in concepts and models and use the patterns or structure within a problem to solve related problems; changes structure(s) to an appropriate equivalent form(s) to solve a problem; interprets, models, and connects multiple representations.	Steps back and shifts perspectives based on a problem's structure; identifies similarities between different mathematical forms, and uses patterns from known situations to solve nonroutine problems; chooses an equivalent structure based on efficiency or its power to communicate solution.
	Does not analyze reasonableness of intermediate results.	Recognizes when intermediate results do not make sense.	Analyzes reasonableness of intermediate results and if results don't make sense, determines why they don't.	Analyzes reasonableness of intermediate results and changes course to a more effective or efficient process.
	Has difficulty viewing simple quantities both as single objects and as composition of several objects.	Views simple quantities both as single objects or as a composition of several objects and uses operations to make sense of a problem.	View complicated quantities both as single objects or composition(s) of several objects and uses operations to make sense of a problem.	Views and analyses complicated quantities both as single objects or composition(s) of several objects and uses operations flexibly to make sense of a problem.

Ohio | Department of Education

SMP	Needs Improvement	Emerging	Proficient	Exemplary
MP.8 Look for and Express Regularity in Repeated Reasoning.	Examines task in isolation; does not understand the hierarchy within concepts; cannot recognize a known problem within a different context.	Starts to draw connections to prior or future concepts; can complete a similar problem with prompting to get started	Draws connections to prior or future concepts to develop understanding of procedural tasks; can complete a similar problem to get started.	Connects tasks to prior concepts and tasks and evaluates which concepts are most efficient and applies strategies to nonroutine tasks.
	Cannot demonstrate a logical progression that leads to pattern recognition.	Demonstrates a logical progression that leads to pattern recognition but applies an incorrect progression for the context.	Demonstrates a logical progression that leads to pattern recognition and a solution based on a pattern of repeated reasoning.	Demonstrates a logical progression that leads to pattern recognition and applies solution based on repeated reasoning to a new situation including nonroutine tasks.
	Does not notice general methods or shortcuts.	Uses memorized shortcuts without understanding its basis on repeated calculations.	Notices repeated calculations and look for general methods and shortcuts based on repeated calculations.	Generalizes processes and applies them to higher-level problem solving implementing short cuts; generates exploratory questions based on current task; able to articulate multiple approaches and/or answers to a problem.
	Does not monitor intermediate results.	Occasionally monitors intermediate results asking "Why?" when something doesn't work.	Continually evaluates the reasonableness of intermediate results while attending to the details and make generalizations based on findings.	Continually evaluates the reasonableness of intermediate results while attending to the details and make generalizations based on findings; encourages peers to monitor each other's intermediate results.

Ohio | Department of Education